BIOLOGY (BIOL)

BIOL*1020 Introduction to Biology Fall Only (LEC: 3, LAB: 2) [0.50]
This course will introduce concepts concerning the organization of life, from molecules to cells to ecosystems and discuss how they relate to day-to-day life. The dynamic and interactive nature of all living systems will be emphasized. The weekly tutorial will introduce students to the application of biology to daily life and emphasize critical thinking skills. This course will be valuable for students without Grade 12 or 4U Biology who are interested in environmental issues, medicine, agriculture, biodiversity and related topics.
Restriction(s): BIOL*1050, BIOL*1070, BIOL*1080, BIOL*1090
Department(s): Department of Integrative Biology, Department of Molecular and Cellular Biology
Location(s): Guelph

BIOL*1050 Biology of Plants & Animals in Managed Ecosystems Fall Only (LEC: 3, LAB: 2) [0.50]
In this course students will investigate the biology of plants and animals in the context of agroecosystems and other managed ecosystems. Students will learn about the form and function of plants and animals and interactions between organisms and their environments. The course strongly emphasizes participatory and self-directed learning, problem solving, reasoning and exposure to primary research literature and will address key concepts in evolution, plant and animal structure, physiology and ecology. Students lacking Grade 12 or 4U Biology should consult with their program counsellor prior to taking BIOL*1050 in first semester.
Department(s): Department of Plant Agriculture, Department of Animal Biosciences
Location(s): Guelph

BIOL*1070 Discovering Biodiversity Fall and Winter (LEC: 3) [0.50]
This course strongly emphasizes the development of learning and reasoning skills, an understanding of the nature of biological inquiry, and key concepts in evolution, ecology, and organismal biology. These include the meaning and significance of biodiversity and current issues surrounding it, the evolutionary processes through which biological diversity originates and is interrelated, the complexity of organisms and the importance of physical organization and regulatory processes, and the nature of interactions among organisms and between organisms and their biotic and abiotic environments. Students lacking Grade 12 or 4U Biology should consult with their program counsellor prior to taking BIOL*1070 in first semester.
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*1080 Biological Concepts of Health Fall and Winter (LEC: 3, LAB: 1) [0.50]
This course will define the physiology of the individual as the biological foundation of health and focus on selected studies of health and illness in the adult human. Students will derive an understanding of the biological foundation of their own health as an adult and will be encouraged to expand the concepts and processes of individual health to human populations, animals and the environment. Through lectures, laboratories, small group tutorials and an individual research project, students will gain an introduction to research in the health sciences. Students lacking Grade 12 or 4U Biology should consult with their program counsellor prior to taking BIOL*1080 in first semester.
Department(s): Department of Human Health and Nutritional Sciences
Location(s): Guelph

BIOL*1090 Introduction to Molecular and Cellular Biology Fall and Winter (LEC: 3) [0.50]
This course will foster an understanding of key concepts in molecular and cell biology and genetics including evolution, relationship between structure and function, energy and regulation, interrelatedness of life, and the nature of science. By relating these concepts to their daily lives, through analysis of problems and tutorial discussions, students will develop an understanding of five central themes: 1) all living things share common properties, 2) the cell is the fundamental functional unit of life, 3) managing energy is central to success, 4) genes are the fundamental information unit of life, and 5) heredity. Students lacking Grade 12 or 4U Biology should consult with their program counsellor prior to taking BIOL*1090 in first semester.
Department(s): Department of Molecular and Cellular Biology
Location(s): Guelph

BIOL*1500 Humans in the Natural World Fall and Winter (LEC: 3) [0.50]
This course will examine past and present human interactions with Nature from an ecological perspective. It investigates current global issues that require multi-disciplinary environmental analysis.
Offering(s): Also offered through Distance Education format.
Restriction(s): Students in the BAS, BOH, BSC and BSES program cannot take this course for credit.
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*2060 Ecology Summer, Fall, and Winter (LEC: 3, LAB: 1) [0.50]
This course discusses the ecology of plants, animals, fungi and bacteria as individual organisms, interacting populations, communities and ecosystems. Lectures and discussion groups are used to demonstrate the difficulty of interpreting ecological data derived from field studies. The value of laboratory-based research in ecology will also be discussed. The course will be important for anyone who wishes to understand what we know and need to know about the way ecological systems work.
Offering(s): Also offered through Distance Education format.
Prerequisite(s): 4.00 credits including BIOL*1070
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*2300 Field Course in Biodiversity Fall Only (LEC: 1, LAB: 6) [0.50]
This field course provides an opportunity for students to explore the biological diversity of a selected landscape from the perspectives of Western science and Indigenous culture. Students, working in collaboration with Indigenous peoples, will collect field samples using methods from Western scientific and Indigenous knowledge systems. Data will be analyzed to evaluate strengths and limitations of these methods and to examine factors affecting diversity and sustainable methods of land stewardship. Using knowledge gained, students will discuss and communicate their findings with diverse audien
Prerequisite(s): BIOL*1070
Restriction(s): Instructor consent required.
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*2400 Evolution Summer, Fall, and Winter (LEC: 4) [0.50]
This course provides a broad overview of evolutionary biology. It examines the concepts and mechanisms that explain evolutionary change and the evolution of biological diversity at different levels of biological organization (gene to ecosystem) and across space and time. It also introduces historical forms of scientific inquiry, unique to biology. The course is designed to be of interest to students with general interests in science and in research in all areas of biology.
Offering(s): Also offered through Distance Education format.
Prerequisite(s): BIOL*1070, BIOL*1090
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*3010 Laboratory and Field Work in Ecology Fall Only (LAB: 6) [0.50]
This course emphasizes field and laboratory work in ecology. Students will gain experience with experimental designs, sampling, analysis and interpretation of data collected to answer ecological questions. Local field sites will be used to run in-course experiments. Critical thinking about ecological issues relevant to society will be emphasized.
Prerequisite(s): BIOL*2060, (STAT*2040 or STAT*2230)
Restriction(s): Restricted to students in BSCH.WBC, BSES.ECOL, BSES.ECOL:C, ECOL minor
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*3020 Population Genetics Fall Only (LEC: 4) [0.50]
This course is designed to explore the concepts of random mating, inbreeding, random drift, population structure and selection as they relate to natural populations. The course also examines modern molecular population genetics and population genomics .
Prerequisite(s): MBG*2040
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*3040 Methods in Evolutionary Biology Winter Only (LEC: 2, LAB: 2) [0.50]
This course will provide students with an understanding of some of the major analytical approaches used in modern evolutionary biology and an appreciation of the relevance of these methods to other branches of the life sciences. This includes the analysis of molecular data, phylogenetics and "tree thinking", population genetics, genomics, phenotypic selection, experimental evolution, and hypothesis generation and testing in historical sciences. In addition to lectures, laboratory sessions will be devoted to practical training in analytical tools using specialized computer software and real datasets. Students will also be exposed to recent scientific literature and will undertake an independent project in order to experience these approaches in action.
Prerequisite(s): BIOL*2400
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*3060 Populations, Communities and Ecosystems Winter Only (LEC: 4) [0.50]
This course will explore advanced topics in ecology, building on the foundation provided by BIOL*2060. The course material will be organized around common mechanisms that link ecological processes across levels of organization, such as organism function, species interactions, spatial connectivity and energetic transfers across trophic levels. Emphasis will be on testing ecological theory with quantitative analysis of empirical data, thereby gaining greater depth of understanding of ecological processes at the population, community and ecosystem scales. Through the examination of case studies, students will apply ecological knowledge and quantitative analysis to problem solving in areas such as resource management, conservation of populations and communities, and predicting biosphere responses to climate change.
Prerequisite(s): 10.00 credits including BIOL*2060, (1 of GEOG*2460, STAT*2040, STAT*2060, STAT*2230)
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*3130 Conservation Biology Winter Only (LEC: 4) [0.50]
This course is an introduction to the biological basis for conserving wild, living resources, including freshwater and marine fish, plants and wild life. Topics to be covered include principles of population, community and landscape genetics and ecology relevant to the conservation, restoration and management of endangered species, ecosystems and/or renewable resources, including an introduction to the theory and practice of sustained-yield harvesting.
Prerequisite(s): BIOL*2060
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*3300 Applied Bioinformatics Fall Only (LEC: 3, LAB: 2) [0.50]
This course covers current methods for making use of large molecular data sets to identify the genes that control traits, to characterize genes' functions, and to infer genetic relationships among individuals. It focuses on case studies and current research in agriculture, environmental biology, and medicine to introduce molecular data analysis methods, including analyzing genome sequences, constructing nucleotide and protein sequence alignments, constructing phylogenies, and finding motifs and genes in biological sequences. Lab sessions include an introduction to Unix and Python for the biologist and hands-on use of several molecular data analysis programs.
Prerequisite(s): MBG*2040, (STAT*2040 or STAT*2230)
Department(s): Department of Plant Agriculture
Location(s): Guelph

BIOL*3450 Introduction to Aquatic Environments Fall Only (LEC: 3) [0.50]
This course provides an introduction to the structure and components of aquatic ecosystems, how they are regulated by physical, chemical and biological factors, and the impact of humans on these environments and their biota.
Prerequisite(s): BIOL*2060, CHEM*1050
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*3650 Applications in Biology Winter Only (LEC: 3) [0.50]
In this course, students will explore selected topics related to the application of biological knowledge and techniques in society, such as biotechnology, forensic science, conservation biology, agriculture, health care, public health, and wildlife biology. Different topics are offered each year, reflecting the particular research or professional interest of the course instructor. Upcoming topics will be posted on the B.Sc. Advising website.
Prerequisite(s): 9.00 credits including (2 of BIOL*1070, BIOL*1080, BIOL*1090)
Restriction(s): This is a Priority Access Course. Enrolment may be restricted to particular CBS programs or specializations depending on the selected topic during certain periods. Please refer to the BSC Advising Website.
Department(s): Dean's Office, College of Biological Science
Location(s): Guelph

BIOL*3660 Internship In Biological Science Summer, Fall, and Winter (LEC: 1) [0.50]
This course provides an opportunity for independent learning in the biological sciences within a work-related environment (volunteer or paid). Students will develop a project plan directly related to the work experience in consultation with an external organization. Using this experience, students will apply knowledge of scientific methodologies to develop a project that benefits the organization and society at large, apply disciplinary knowledge and project management skills to complete the project, and reflect on their own development and future career plans. Students interested in this course must submit a completed registration form, for approval by the course coordinator, as part of the registration process for this course.
Prerequisite(s): 7.50 credits, minimum cumulative average of 60%
Restriction(s): Majors offered by CBS. Instructor consent required.
Department(s): Dean's Office, College of Biological Science
Location(s): Guelph

BIOL*3670 Introduction to Wildlife Rehabilitation Fall Only (LEC: 3) [0.50]
This course focuses on Canadian wildlife and ways to mitigate various human-animal interactions. There will be a specific emphasis on wildlife rehabilitation: its benefits, risks (to humans and animals), ethical concerns, principles of stabilization of sick and injured animals, and other key areas for consideration. Common presentations and underlying reasons for sick and injured animals that are admitted to a rehabilitation centre are presented. Whether in a wildlife centre or in the field, understanding important physiologic differences between species and how to stabilize animals for subsequent treatment by a permitted rehabilitator or a wildlife veterinarian are discussed.
Offering(s): Offered through Distance Education format only.
Prerequisite(s): 1 of ANSC*2340, BIOL*2060, BIOL*2400, ZOO*2090
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*3680 Wildlife Rehabilitation: Caring for Sick, Injured, and Orphaned Wildlife Winter Only [0.50]
Wildlife rehabilitation is an important aspect of species protection and conservation, and a valuable career path for individuals with a special interest in wildlife biology. Content focuses on Canadian wildlife in terms of how to rehabilitate, triage, and stabilize sick, injured, and orphaned wildlife. Mitigating risk of illness and/or injury during the rehabilitation process will be discussed. This course helps prepare students to write the MNRF wildlife custodial authorization examination should they wish to pursue wildlife ehabilitation.
Offering(s): Offered through Distance Education format only.
Prerequisite(s): BIOL*3670
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4010 Adaptational Physiology Winter Only (LEC: 3) [0.50]
This course examines adaptations of organisms to various aquatic and terrestrial environments. A mechanistic approach will be used to establish the strategies (anatomical, physiological, biochemical) of environmental adaptation. Examples will include adaptations of deep-sea and polar organisms, adaptations to salinity and desiccation challenges, oxygen availability, sensory adaptations and symbiotic adaptations.
Co-requisite(s): ZOO*3210 or ZOO*3620
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4020 Integrative Problems in Biological Science Fall and Winter (LEC: 6) [1.00]
In this course, students work in teams to explore and address an authentic, biologically-based problem using an integrative and interdisciplinary approach. Topics are proposed by an external 'client' and will focus on a problem relating to societal needs (e.g., food, health, and environment), use of advanced technologies (e.g., genetic modification), or aspirations (e.g. sustainability). Students will explore the underlying basis for the problem, the current state of understanding, social implications, and develop a product or position to address the client's needs.
Prerequisite(s): 14.00 credits
Restriction(s): Restricted to students in BSCH.BIOS
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4110 Ecological Methods Fall Only (LEC: 3, LAB: 3) [1.00]
This course will examine the theoretical and practical aspects of research methods in ecology. Emphasis will be placed on experimental design, sampling, population estimation, statistical inference, and characteristics of producers and consumers. Students will participate in research projects of their own design, and will gain experience in preparing research proposals, research papers and posters, and making oral presentations.
Prerequisite(s): BIOL*3010, BIOL*3060, (STAT*2040 or STAT*2230)
Restriction(s): Restricted to students in BSCH.WBC and Ecology majors/minors
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4120 Evolutionary Ecology Winter Only (LEC: 4) [0.50]
This course is an examination of common ecological circumstances faced by plants and animals and the morphological, behavioral and life history characteristics that have evolved in response. Particular emphasis will be placed on evolutionary processes and on adaptive aspects of thermoregulation, foraging strategies, spatial distribution, social and reproductive strategies. The course will emphasize both the theoretical basis and the empirical evidence for ecological adaptation.
Prerequisite(s): BIOL*2060, BIOL*2400
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4150 Wildlife Conservation and Management Fall Only (LEC: 3) [0.50]
This course builds on previous courses in population and community ecology to evaluate the long-term dynamics of threatened populations in the context of human intervention. The course will also provide a "hands-on" introduction to computer modeling, with application to contemporary issues in population ecology and resource management. Lectures will be drawn from the following topics: growth and regulation of populations, long-term persistence of ecological communities, harvesting, bio-economics, and habitat modification.
Prerequisite(s): BIOL*3060 or BIOL*3130
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4350 Limnology of Natural and Polluted Waters Fall Only (LEC: 3, LAB: 3) [0.50]
This course will familiarize students with the characteristics and methods of study of the limnology of natural and polluted aquatic ecosystems. The laboratory includes methods of biological, chemical and physical assessment such as field surveys of algal, macrophyte and benthic invertebrate diversity, toxicity assays, and analyses of stream flow.
Prerequisite(s): BIOL*3450
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4410 Field Ecology Fall Only (LEC: 3, LAB: 3) [0.75]
This is a 12-day field course held in Algonquin Park, Ontario, during August. Students independently conduct and write reports about 2 research projects of their choice and design (in consultation with faculty members), on any of: vertebrate, invertebrate, or plant ecology, and/or behaviour, in terrestrial or aquatic habitats. Emphasis is placed upon students asking ecological questions, designing experiments, and then collecting data from intensive field work. There are no formal lectures, but an organizational meeting is held in the winter semester prior to the field course. The charge by the field station for room and board will be passed on to the student. Students are also responsible for their own transportation to and from the field station. A departmental application form must be submitted for approval at least 4 weeks prior to the last day of course selection for the Summer semester, and the signature of the course coordinator will be required to select the course. This course must be recorded as part of your Fall course selection and tuition and compulsory fees will be calculated accordingly. Students taking this course DO NOT use course numbers reserved for Ontario Universities Program in Field Biology. Detailed information is available from the Department of Integrative Biology.
Prerequisite(s): 0.50 credits in Ecology
Restriction(s): Instructor consent required.
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4500 Natural Resource Policy Analysis Winter Only (LEC: 3) [0.50]
This course explores the role of science in management decision-making for Canadian renewable natural resources, including legal, political, social and economic factors. The course will rely on active learning by students working in collaborative groups, leading to deeper understanding of real-world issues while developing professional skills that are essential for those who wish to make significant contributions at the science-management interface. Four themes will be explored: 1) acts/policies/guidelines, 2) science and other knowledge systems, 3) management strategy evaluation, and 4) decision analysis & adaptive management.
Prerequisite(s): 15.00 credits including BIOL*4150
Restriction(s): Registration in Semester 7 or 8.
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4610 Arctic Ecology Fall Only (LEC: 1, LAB: 6) [0.75]
This three-week field course provides an opportunity to study the flora and fauna of marine, freshwater and terrestrial environments of the high Arctic. Based in the high Arctic, the course includes lectures, field exercises and student projects. An information session is held in January; students are required to register before March. Signature of course coordinator is required for course selection. Students are responsible for cost of food and transportation. This course must be recorded as part of your Fall course selection and tuition and compulsory fees will be calculated accordingly. Students taking this course DO NOT use course numbers reserved for Ontario Universities Program in Field Biology. Detailed information is available from the Department of Integrative Biology.
Offering(s): Offered in even-numbered years.
Prerequisite(s): BIOL*2060
Restriction(s): Instructor consent required.
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4700 Field Biology Summer, Fall, and Winter (LEC: 1, LAB: 6) [0.50]
Students may apply for 2-week courses in the OUPFB (Ontario Universities Program in Field Biology). This program offers a diversity of field courses in biological subjects ranging from the Arctic to the Tropics, microbes to mammals, and covering marine, freshwater and terrestrial habitats. Costs include food and lodging and may include transportation. Detailed information is available from the Department of Integrative Biology.
Prerequisite(s): BIOL*2060
Restriction(s): Permission of the course coordinator. Instructor consent required.
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4710 Field Biology Summer, Fall, and Winter (LEC: 1, LAB: 6) [0.25]
Students may apply for 1-week courses in the OUPFB (Ontario Universities Program in Field Biology). This program offers a diversity of field courses in biological subjects ranging from the Arctic to the Tropics, microbes to mammals, and covering marine, freshwater and terrestrial habitats. Costs include food and lodging and may include transportation. Detailed information is available from the Department of Integrative Biology.
Prerequisite(s): BIOL*2060
Restriction(s): Permission of the course coordinator. Instructor consent required.
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4800 Field Biology Summer, Fall, and Winter (LEC: 1, LAB: 6) [0.50]
Students may apply for 2-week courses in the OUPFB (Ontario Universities Program in Field Biology). This program offers a diversity of field courses in biological subjects ranging from the Arctic to the Tropics, microbes to mammals, and covering marine, freshwater and terrestrial habitats. Costs include food and lodging and may include transportation. Detailed information is available from the Department of Integrative Biology.
Prerequisite(s): BIOL*2060
Restriction(s): Permission of the course coordinator. Instructor consent required.
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4810 Field Biology Summer, Fall, and Winter (LEC: 1, LAB: 6) [0.25]
Students may apply for 1-week courses in the OUPFB (Ontario Universities Program in Field Biology). This program offers a diversity of field courses in biological subjects ranging from the Arctic to the Tropics, microbes to mammals, and covering marine, freshwater and terrestrial habitats. Costs include food and lodging and may include transportation. Detailed information is available from the Department of Integrative Biology.
Prerequisite(s): BIOL*2060
Restriction(s): Permission of the course coordinator. Instructor consent required.
Department(s): Department of Integrative Biology
Location(s): Guelph

BIOL*4900 Field Biology Summer, Fall, and Winter (LEC: 1, LAB: 6) [0.50]
Students may apply for 2-week courses in the OUPFB (Ontario Universities Program in Field Biology). This program offers a diversity of field courses in biological subjects ranging from the Arctic to the Tropics, microbes to mammals, and covering marine, freshwater and terrestrial habitats. Costs include food and lodging and may include transportation. Detailed information is available from the Department of Integrative Biology.
Prerequisite(s): BIOL*2060
Restriction(s): Permission of the course coordinator. Instructor consent required.
Department(s): Department of Integrative Biology
Location(s): Guelph